The German implementation of the EU Directive on the Energy Performance of Buildings (EPBD)

The new Energy Conservation Regulations 2006 in Germany

Hans Erhorn

Fraunhofer Institute of Building Physics (IBP)

Fraunhofer Institut Bauphysik

The Background

1992: World Summit Rio

Worldwide Reduction of the Greenhouse Gas Emissions in 2000 to basis of 1990

1995: World Summit Berlin

25% Reduction of CO_2 Emissions in Germany in 2005 on basis 1990

1997: World Summit Kyoto

European Burden-Sharing (EU wide 30% Reduction, Germany 40%)

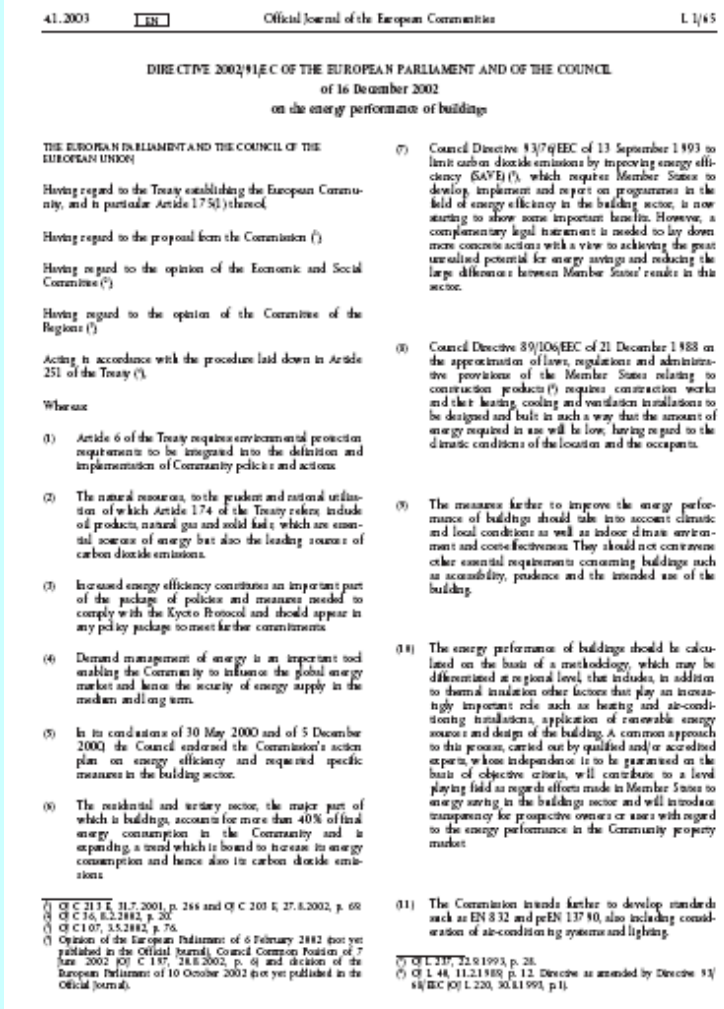
2002: EU (Parliament and Council)

Adoption of the Energy Performance of Building Directive (EPBD)

2006: EU – Member States

National implementation of the EPBD required

Energy Performance of Building Directive



4.1.2003 EN Official Journal of the European Communities L 1/65

DIRECTIVE 2002/91/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 16 December 2002
on the energy performance of buildings

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission (1),

Having regard to the opinion of the Economic and Social Committee (2),

Having regard to the opinion of the Committee of the Regions (3),

Acting in accordance with the procedure laid down in Article 251 of the Treaty (4),

Whereas:

(1) Article 6 of the Treaty requires environmental protection requirements to be integrated into the definition and implementation of Community policies and actions.

(2) The natural resources, to be prudent and rational utilisation of which Article 174 of the Treaty refers, include oil products, natural gas and solid fuels, which are essential sources of energy but also the leading sources of carbon dioxide emissions.

(3) Increased energy efficiency constitutes an important part of the package of policies and measures needed to comply with the Kyoto Protocol and should appear in any policy package to meet further commitments.

(4) Demand management of energy is an important tool enabling the Community to influence the global energy market and hence the security of energy supply in the medium and long term.

(5) In its conclusions of 30 May 2000 and of 5 December 2000, the Council endorsed the Commission's action plan on energy efficiency and requested specific measures in the building sector.

(6) The residential and tertiary sector, the major part of which is buildings, accounts for more than 40% of final energy consumption in the Community and is expanding, a trend which is bound to increase its energy consumption and hence also its carbon dioxide emissions.

(7) Council Directive 93/76/EEC of 13 September 1993 to limit carbon dioxide emissions by improving energy efficiency (SAVE) (5), which requires Member States to develop, implement and report on programmes in the field of energy efficiency in the building sector, is now starting to show some important benefits. However, a complementary legal instrument is needed to lay down more concrete actions with a view to achieving the great unrealised potential for energy savings and reducing the large differences between Member States' results in this sector.

(8) Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (6) requires construction works and their heating, cooling and ventilation installations to be designed and built in such a way that the amount of energy required in use will be low, having regard to the climatic conditions of the location and the occupants.

(9) The measures further to improve the energy performance of buildings should take into account climatic and local conditions as well as indoor climate environment and cost-effectiveness. They should not contravene other essential requirements concerning buildings such as accessibility, prudence and the intended use of the building.

(10) The energy performance of buildings should be calculated on the basis of a methodology, which may be differentiated at regional level; that includes, in addition to thermal insulation other factors that play an increasingly important role such as heating and air-conditioning installations, application of renewable energy sources and design of the building. A common approach to this process, carried out by qualified and/or accredited experts, whose independence is to be guaranteed on the basis of objective criteria, will contribute to a level playing field as regards efforts made in Member States to energy saving in the buildings sector and will introduce transparency for prospective owners or users with regard to the energy performance in the Community property market.

(11) The Commission intends further to develop standards such as EN 832 and prEN 13790, also including consideration of air-conditioning systems and lighting.

(1) OJ C 213 E, 31.7.2001, p. 266 and OJ C 203 E, 27.8.2002, p. 68.
(2) OJ C 36, 8.2.2002, p. 20.
(3) OJ C 107, 3.5.2002, p. 76.
(4) Opinion of the European Parliament of 6 February 2002 (not yet published in the Official Journal), Council Common Position of 7 June 2002 (OJ C 187, 28.8.2002, p. 6) and decision of the European Parliament of 10 October 2002 (not yet published in the Official Journal).
(5) OJ L 237, 22.9.1993, p. 28.
(6) OJ L 40, 11.2.1989, p. 12. Directive as amended by Directive 93/68/EEC (OJ L 220, 30.8.1993, p. 1).

Article 1

Objective

The objective of this Directive is to promote the improvement of the energy performance of buildings within the Community, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.

This Directive lays down requirements as regards:

(a) the general framework for a methodology of calculation of the integrated energy performance of buildings;

(b) the application of minimum requirements on the energy performance of new buildings;

(c) the application of minimum requirements on the energy performance of large existing buildings that are subject to major renovation;

(d) energy certification of buildings; and

(e) regular inspection of boilers and of air-conditioning systems in buildings and in addition an assessment of the heating installation in which the boilers are more than 15 years old.

Hans Erhorn

Fraunhofer Institut Bauphysik

Energy Performance of Building Directive

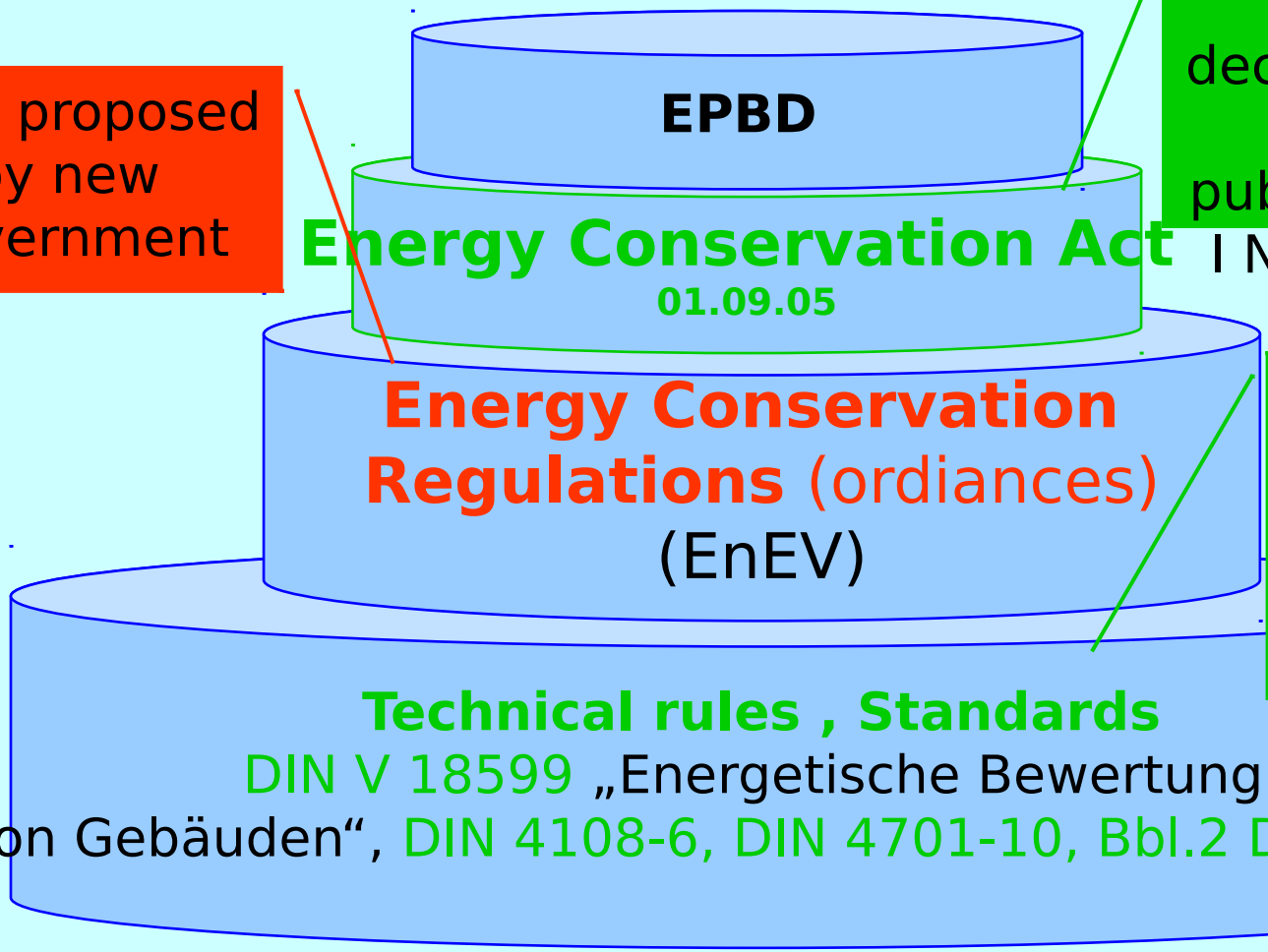
Main Articles

3 Adoption of methodology (asset/operational; CEN/national methods)
4 Settings of energy performance requirements (Final/Primary energy;CO_2)
5 New buildings (alternative systems have taken into account; >1000 m^2)
6 Existing buildings (major renovation; reqirements component or whole)
7 Energy performance certificate (scheme design; public buildings)
8 Inspection of boilers (inspection schemes or advice options)
9 Insepction of air-conditioning systems (A/C or also ventilation systems)
10 Independent experts (how to ensure independency; certification procedure)
11 Review (evaluation of the directive with experience from application phase)
14 Committee (assisted Commission by Member States representatives)
15 Transposition (Implementation of several articles only, extentions)

Hans Erhorn

Fraunhofer Institut Bauphysik

The implementation of the EPBD in Germany


EPBD
Energy Conservation Act
01.09.05
Energy Conservation Regulations (ordiances)
(EnEV)
Technical rules , Standards
DIN V 18599 „Energetische Bewertung von Gebäuden“, DIN 4108-6, DIN 4701-10, Bbl.2 DIN 4108 ...

Soon proposed by new Government

Second last decision by former Governm. published at BGBl. I Nr.56 07. Sept. 05

Published (6/05) DIN V 18599 and draft techn. design guides (simplification)

Hans Erhorn

Fraunhofer IBP Institut Bauphysik

Essentials of the EU-Regulation – Situation in Germany

Integral Approach

Property	Remarks
Insulation	ruled by EnEV(DIN 4108 / EN 832)
Heating and Hot Water Heating System	ruled by EnEV(DIN 4701-10)
Air Conditioning	no technical rules exist so far has to be avoided in residential buildings
Utililzation System	ruled by EnEV(DIN 4701-10)
Illumination (in Non-residential buildings)	no technical rules so far no demands for residential buildings
Location and Alignment	ruled by EN 832 (EnEV)
Inclusion of Renewable Energy	ruled by EnEV(DIN 4701-10)

Hans Erhorn

Fraunhofer IBP Institut Bauphysik

Essentials of the EU-Regulation – Situation in Germany

Regulation	Germany
• Integral approach rating the energy efficieny of buildings	• Integral approach by means of the EnEV-Method Residential buildings Non-Residential buildings ☑
• Commitment of national energy minimum standards for new constructions	• § 3 / § 4 EnEV: Requirements of Standards for new Constructions ☑
• Commitments of standards for the building stock (Buildings >1000 m² with corresponding large-scale modernization)	• § 8 / § 9 EnEV: Subsequent Requirements and Requirements for modernization measures regardless of size of building ☑

Hans Erhorn

Fraunhofer Institut Bauphysik

Essentials of the EU-Regulation – Situation in Germany

Regulation	Germany
• periodical inspections of boilers (>20 kW), non-recurring inspection of heating-systems >15a, incl. recommandations for improvements (especially inspecting dimensions and efficiency) or consultation	• annual inspection of boilers in acc. with the Decree for Heating (1. BImschV), Replacement commitment for boilers installed before 1978 (§ 9 Abs. 1 EnEV), calculations for dimensioning since 1978 in acc. with HeizAnlV, add. consultation programs (f. i. KfW-Program) ☑
• periodically inspections of air condition systems (>12 kW)	• No obligation so far

Hans Erhorn

Fraunhofer IBP Institut Bauphysik

Essentails of the EU-Regulation – Situation in Germany

Regulation	Germany
• Energy Certifications (for new constructions as well as for building stock– at least when sold or newly let)	• § 13 EnEV Energy Certifications for new constructions and by considerable alterations (voluntary at building stock)
• Energy Certifications for public buildings have to be placed on a prominent place clearly visible to the public (public-authorities give an shinning example)	• Presently no obligation to place the energy certification

Hans Erhorn

Fraunhofer IBP Institut Bauphysik

Standards and Technical Rules

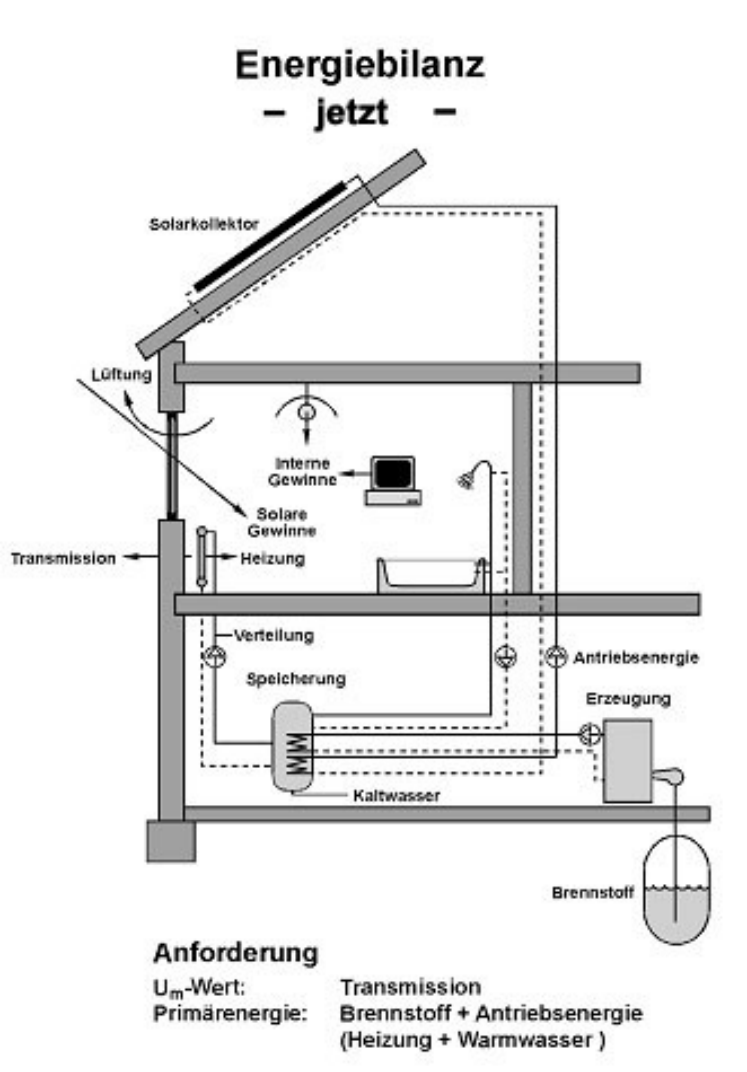
Necessary new Rules	Problematic
• New methods for non-residential buildings (additional inclusion of air condition systems and illumination)	• No technical rules available, CEN planned to file drafts for 31 standards, DIN published DIN V 18599 (available since July 2005)
• Extent of standards for non-residential buildings	• Standards in accordance with A/V-rate may not considered expertly, Standard use = f, „Reference coefficient method“,

$$Q_{Pmax} = Q_{Phmax} + Q_{PLüftmax} + Q_{PWWmax} + Q_{PLmax} + Q_{PKühlmax}$$

Hans Erhorn

Fraunhofer IBP Institut Bauphysik

The existing ENEV approach (residential)



EN ISO 13790 (EN 832) + EN 14335

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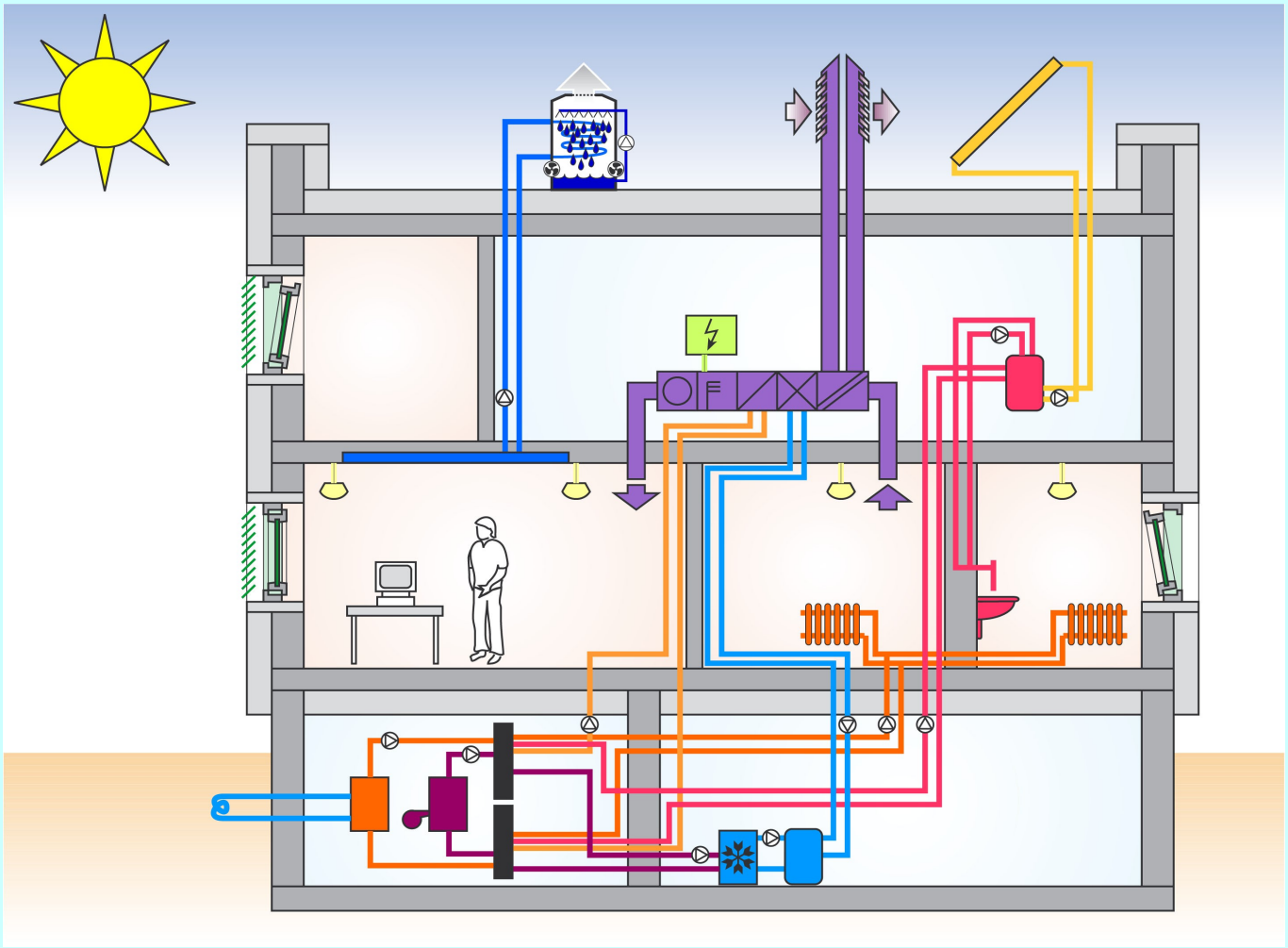
The new ENEV (EnEff) approach (non-residential)



Hollistic standard DIN V 18599 covered all relevant approaches from

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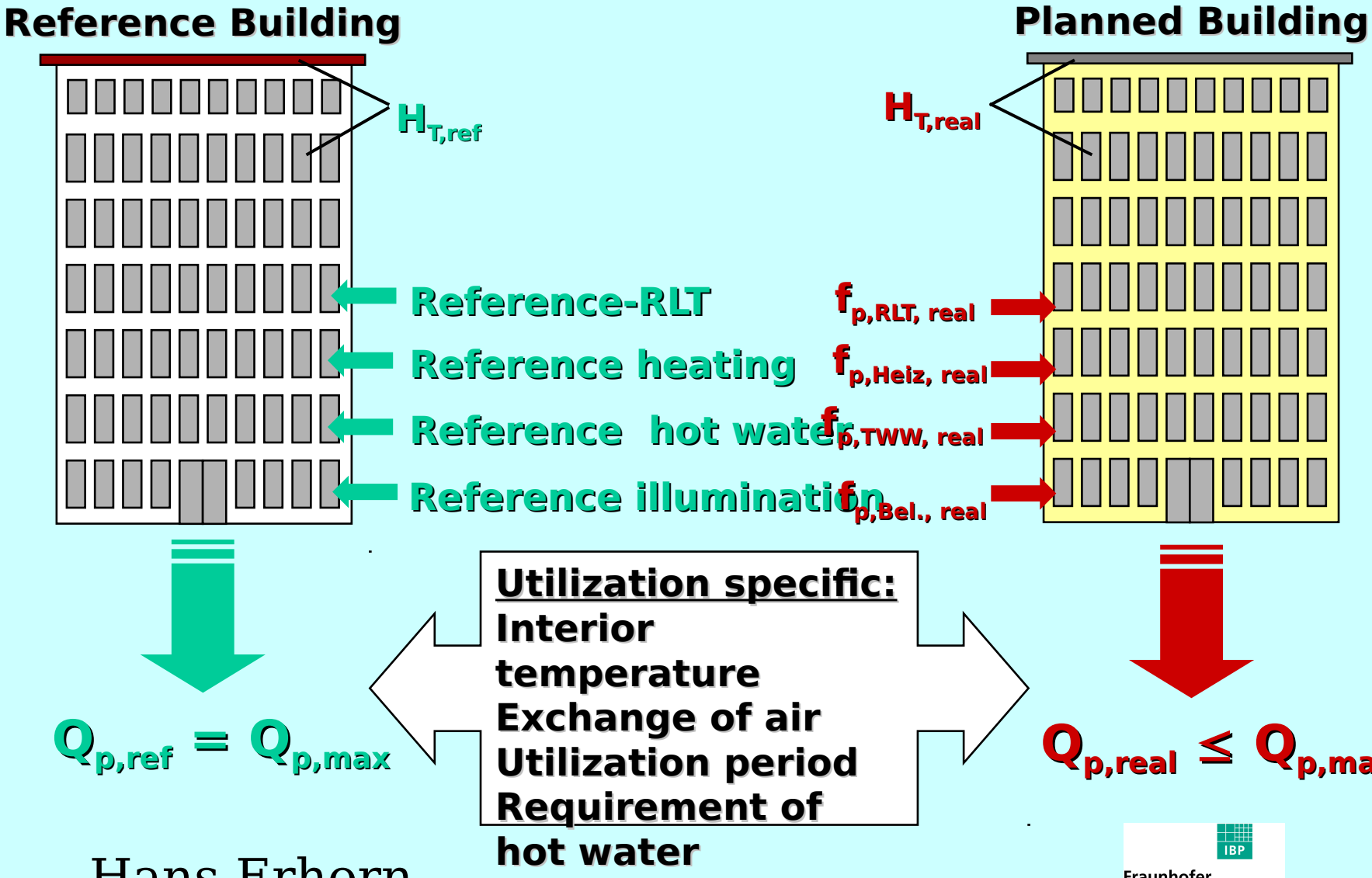
German Realisation of the EPBD: DIN V 18599

Part 1: General
- Definitions
- Balance method
- Zoning
- Primary energy factors
- Influences to the environment

- Part 2: Net energy for room heating and cooling
- Part 3: Net energy demand for air-conditioning
- Part 4: Final energy for lighting
- Part 5: Final energy for heating
- Part 6: Final energy for ventilation systems of dwellings
- Part 7: Final energy for air-conditioning + cooling
- Part 8: Final energy for domestic hot water
- Part 9: Final energy for multifunctional generators
- Part 10: Boundary conditions
- Annex 1: Examples
- Accordances: Energy certification procedure

Hans Erhorn
Fraunhofer Institut Bauphysik (IBP)

Standards in accordance with a Reference Building



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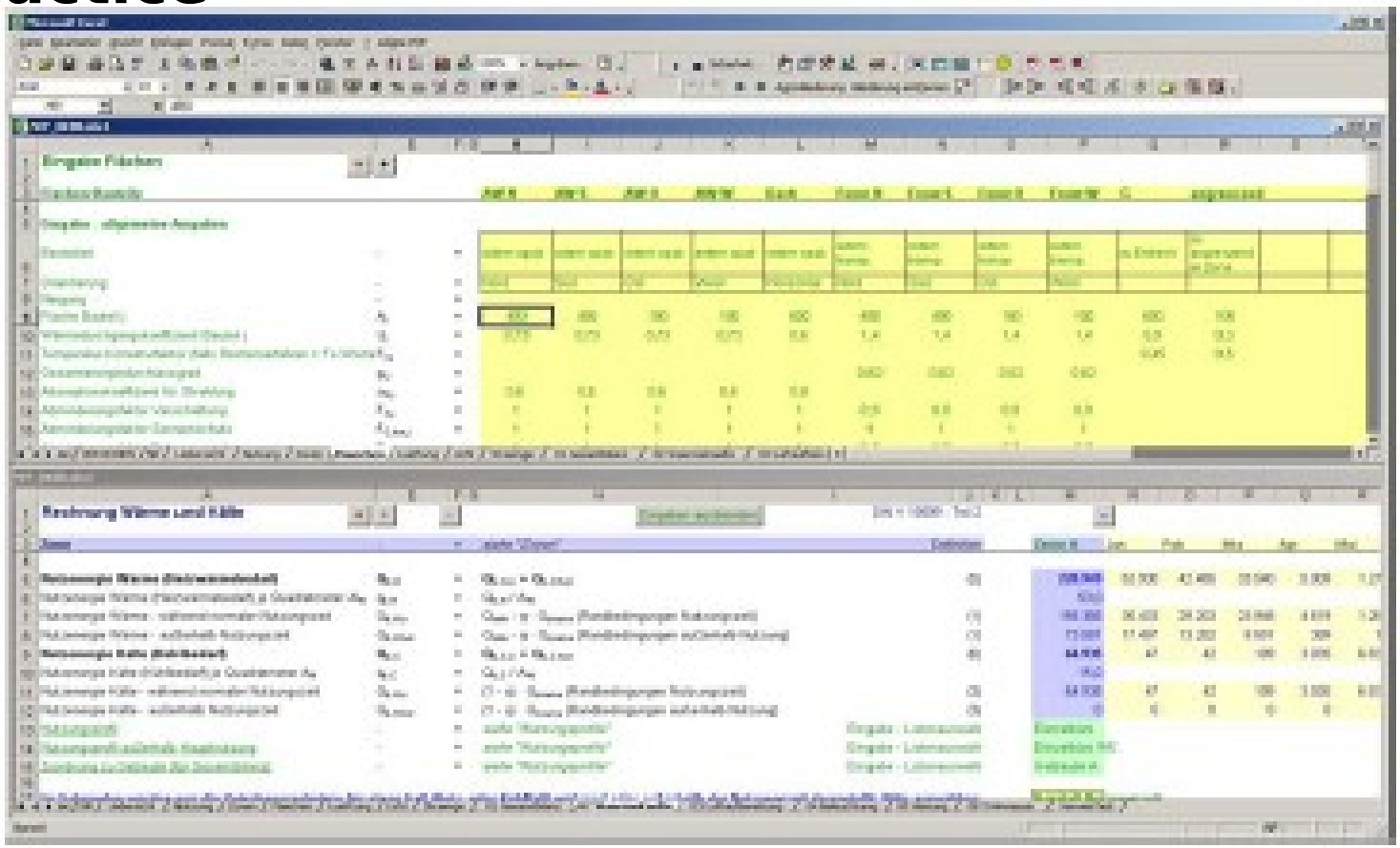
First calculation tools are available for practice



Free download at www.ibp.fraunhofer.de/wt/normen.html

Hans Erhorn

Fraunhofer IBP Institut Bauphysik

Simlpified calculation tools are also available

at www.annex36.com

Hans Erhorn
Fraunhofer Institut Bauphysik

Energy Certifications – field studies by dena

Hans Erhorn

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Certification starts

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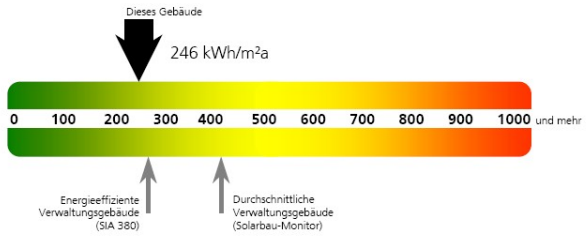
ENERGIEPASS

Projektbezeichung	Energiepass Münchner Tor	Erstellt am	4. November 2004

Gesamtbewertung Primärenergiebedarf

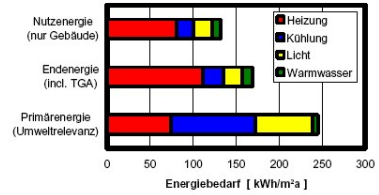

Dieses Gebäude
246 kWh/m²a
0 100 200 300 400 500 600 700 800 900 1000 und mehr
Energieeffiziente Verwaltungsgebäude (SIA 380)
Durchschnittliche Verwaltungsgebäude (Solarbau-Monitor)

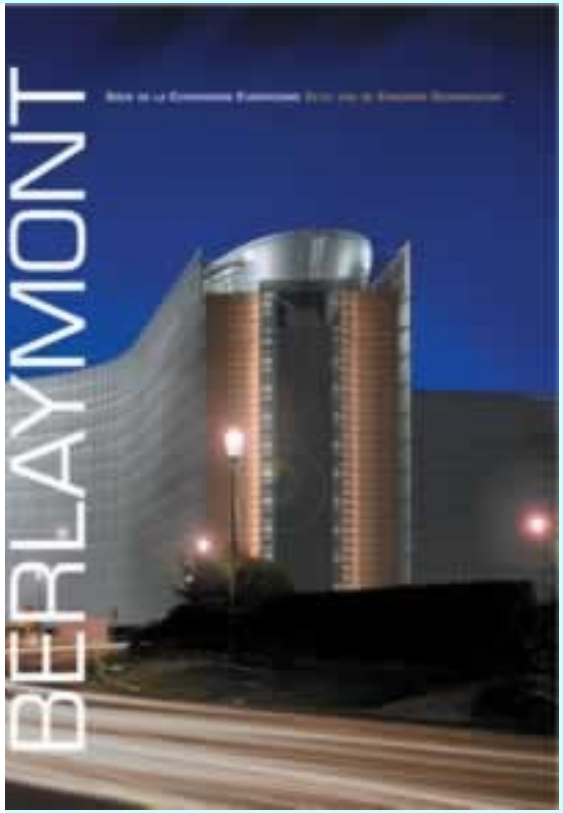
Gebäudetyp/Nutzungsart	Bürogebäude
Adresse	Schlüterstrasse 6-10, 80805 München
Eigentümer	Münchener Rückversicherungsges.
Baujahr Gebäude	2003
Baujahr Anlagentechnik	2003
Bruttogrundfläche	49.258 m²
Energiepaß erstellt mit	DIN V 18599

Eigentümer
Münchener Rückversicherungs-Gesellschaft AG
Königinstr. 107
80802 München

Aussteller
Fraunhofer-Institut für Bauphysik
Nobelstr. 12
70569 Stuttgart

Detailanalyse





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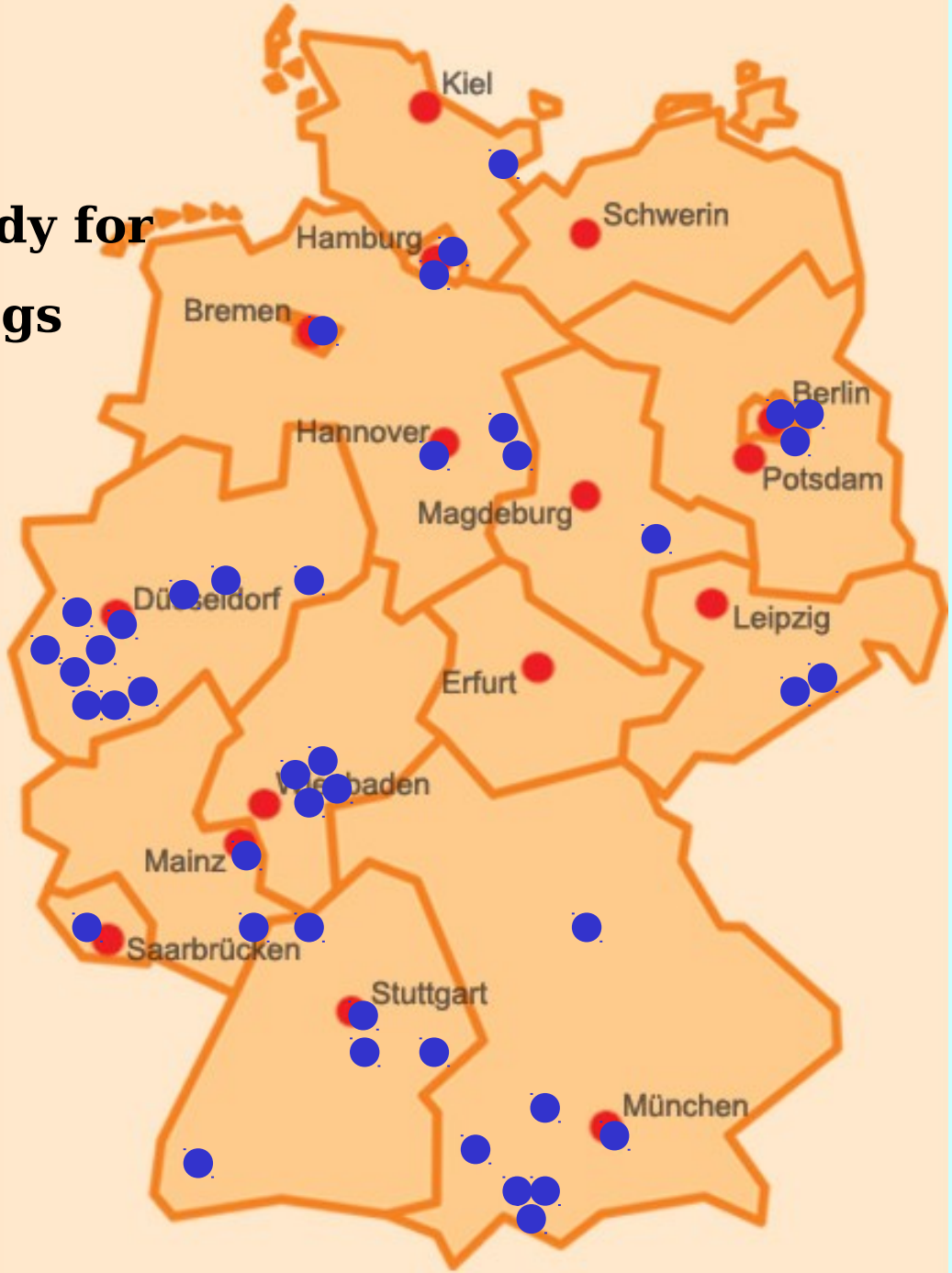
dena
Deutsche Energie Agentur

Actuall runing: Fieldstudy for

Non-Residential Buildings

Building sites

Most building types and regions in Germany are covered



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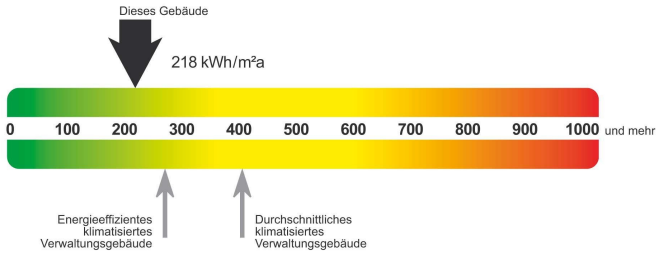
Certificate
Asset rating

ENERGIEPASS

Projektbezeichnung	EU-Kommissions-Gebäude Berlaymont	Erstellt am	16. Dezember 2004

Gesamtbewertung Primärenergiebedarf


Dieses Gebäude
218 kWh/m²a
0 100 200 300 400 500 600 700 800 900 1000 und mehr
Energieeffizientes klimatisiertes Verwaltungsgebäude
Durchschnittliches klimatisiertes Verwaltungsgebäude

Gebäudetyp / Nutzungsart	klimatisiertes Verwaltungsgebäude
Adresse	Rue de la Loi, B-1040 Brüssel
Nutzer	Europäische Union
Baujahr Gebäude	1967 / 2004
Baujahr Anlagentechnik	2004
Nettogrundfläche	170.721 m²
Energiepass erstellt mit	DIN V 18599

Nutzer

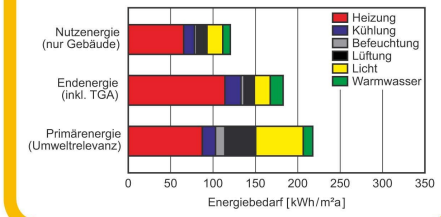
Europäische Union
Rue de la Loi
B-1049 Brüssel

Aussteller

Fraunhofer-Institut für Bauphysik
Nobelstraße 12
D-70569 Stuttgart

Fraunhofer IBP Institut Bauphysik

Detailanalyse



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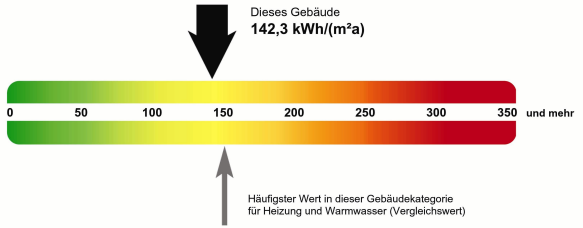
Certificate Operational rating

dena Deutsche Energie-Agentur

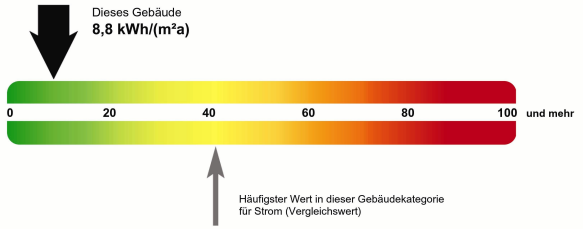
ENERGIEAUSWEIS
für Nichtwohngebäude

Erstellt am: 20.Okt. 2005

Heizenergieverbrauchskennwert (einschließlich Warmwasser)


Dieses Gebäude
142,3 kWh/(m²a)
0 50 100 150 200 250 300 350 und mehr
Häufigster Wert in dieser Gebäudekategorie
für Heizung und Warmwasser (Vergleichswert)

Stromverbrauchskennwert


Dieses Gebäude
8,8 kWh/(m²a)
0 20 40 60 80 100 und mehr
Häufigster Wert in dieser Gebäudekategorie
für Strom (Vergleichswert)

Der Wert enthält den Stromverbrauch für:
- ☐ Beleuchtung
- ☒ Lüftung
- ☐ Kühlung
- ☒ Antriebe
- ☒ Heizung
- ☒ Warmwasser
- ☒ Sonstiges: Aufzüge

Gebäudekategorie	Sozialgebäude, Gemeinschaftshaus
Sonderzone	Kindergarten
Adresse	Johannes-Krämerstraße 2-4, 70597 Stuttgart
Baujahr Gebäude	1965
Baujahr Anlagentechnik	1986
Nettogrundfläche	2.109 m²

Aussteller
Fraunhofer-Institut für Bauphysik
Nobelstraße 12
70569 Stuttgart

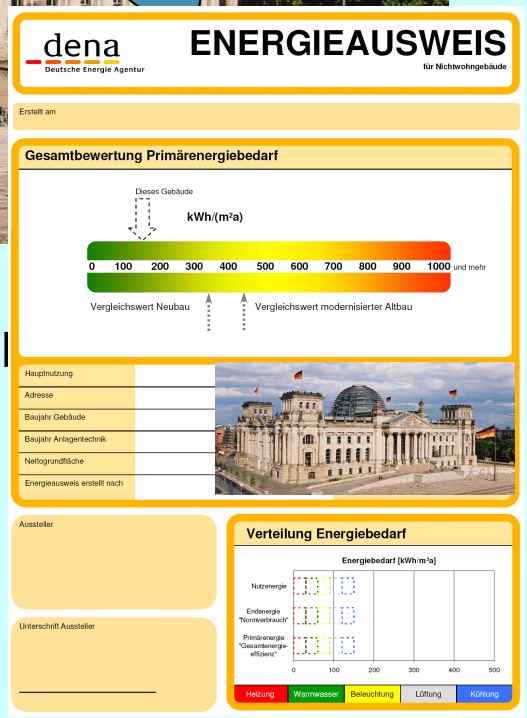
Fraunhofer Institut Bauphysik

Unterschrift Aussteller

Hans Erhorn

Fraunhofer Institut Bauphysik

Certification process for gouvernmen
buildings have been started



Hans Erhorn

The situation in Europe

(24 countries reported in the EU Concerted Action

- **21 countries planned to have national procedures;**
- **all countries have procedures for residential and 2 of non residential buildings; 3 only for special typ**
- **21 countries will use asset rating, 7 benchmark sy**
- **11 counties refered to nat. standards, 13 publishe**
- **7 countries planned to implement CEN standards 12 in a pragmatic way**
- **2 countries are ready with all documents, 12 have in 10 countries documents are still under developr**

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More information monthly available
in the Webzine of the
EPBD Concerted Action Project
EPBD
The Berlaymont: P.Lallemand, S.Beckers, Berlaymont 2000

Now sent to about 450 persons all over the EU: CA, EC, National colleagues, SAVE projects, individual requests, ...

WEBZINE # 5
August 2005

CA-PRACTICAL | COUNTRIES | CERTIFICATION | TRAINING | SAVE | EVENTS | PUBLICATIONS

Newsletter
Concerning the European Building Performance Directive Concerted Action

If this message appears without its colors and pictures, copy this link on to your internet navigator:
http://www.epbd-ca.org//Webzine5.htm

Work is going on:

EPBD-AIVC conference in Brussels (September 21-23) aims to provide additional support

The various deadlines for the implementation of the EPBD are quickly approaching and many challenges still lie ahead of us. Work is going on at various levels : preparation of legislation by the Member States, development of support tools and actions (software, training, etc.), standardisation work, a whole range of SAVE projects aiming to provide support to the Member States and the stakeholder, a wide range of activities

www.epbd-ca.com

Chance Europa:

Fraunhofer IBP as R & D – partner for energy-effizient building concepts

innovation @ bauphysik.de

further informations:

www.ibp.fraunhofer.de/wt

Hans Erhorn
Fraunhofer Institute of Building Physics (IBP)

Fraunhofer IBP Institut Bauphysik